QuadView *Plus*

Video Windowing System

User Manual

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1

INTRODUCTION

GENERAL

The QuadView *Plus* video windowing system displays four live video/computer windows on a high-resolution, RGB display device.

Each channel accepts high-resolution RGB, Y PB PR Component, composite video, and S-Video sources for simultaneous display in windows on a high-resolution, RGB display device. The system comes standard with four input channels. Each input signal can be independently scaled, postioned, and zoomed.

The QuadView *Plus* processor outputs a high-resolution image, at a user-selected scan rate.

RS-232 is the standard remote control method, allowing access to all the QuadView *Plus* processor's functionality.

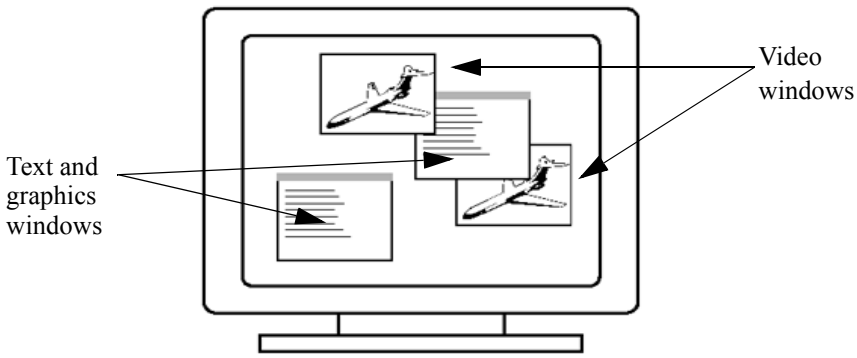

FIGURE 1. **QuadView *Plus* Displays Four Inputs on a Single Monitor**

WINDOW INPUTS

Each channel on the QuadView *Plus* accepts four types of inputs—NTSC or PAL Composite, S-Video, Y PB PR Component, and RGB. All of the input connectors can be populated with sources but only one is displayed at a given time. Note that the Component and RGB are on one connector so you use that channel for either RGB *or* for component video.

Video inputs can come from such devices as a TV camera, video cassette recorder, DVD player, or video teleconferencing system. Analog RGB inputs typically come from a computer and can be interlaced or non-interlaced, up to 1600x1200 pixels, and between 15 and 90kHz. The computer inputs can be of any sync format (sync on green, composite sync, or separate H- and V-drive).

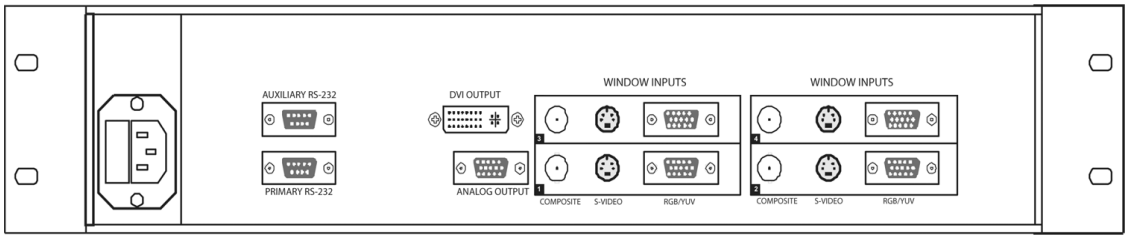

FIGURE 2. **QuadView *Plus* Rear Panel, with Four Inputs in a 2RU Enclosure**

OUTPUT

All input signals to the QuadView *Plus* are converted for display in the output high-resolution format, up to 1600 pixels by 1200 lines, with horizontal scan rates from 15 to 100 kHz.

The output is available on the **ANALOG OUTPUT** connector and can be connected to a computer monitor or to other high scan-rate display devices.

The QuadView *Plus* also offers an optional DVI digital output, up to 1280x1024 pixels.

CONTROL OF THE QUADVIEW *PLUS*

The QuadView *Plus* has a **PRIMARY RS-232** serial port which connects to an ASCII terminal or to any computer with a serial port. Commands are sent from the terminal or computer to the QuadView *Plus*. The commands have a simple syntax and are described in Chapter 5, *"Serial Command Set"*.

The QuadView *Plus* also has an **AUXILIARY RS-232** port, which allows multiple QuadViews to be daisy-chained and controlled by a single terminal or computer. Certain other products from RGB Spectrum also have two serial ports, allowing these units to be part of the chain.

SYSTEM FEATURES

- Accepts four inputs—each input channel accepts NTSC/PAL Composite, S-Video, Y PB PR Component, and high-resolution RGB signals.

- Up to six user-defined presets can be stored and recalled for later use. These presets store information about window size and position, image controls, and overall arrangment of inputs on the screen.
- Input windows can be positioned, scaled, and clipped to an arbitrary size or shape. Scaling of each window is continuous up to the full size of the display raster. Zooming in on a region of interest is also supported.
- Windows are controlled via the RS-232 serial port.
- Many control parameters are automatically saved in nonvolatile memory and can be recalled for later use.
- The system provides a high-resolution analog RGB output, for display on a computer monitor or high scan rate projector.
- The system automatically detects and locks to all computer sync signals. Industry standard and custom video timings are supported.
- Each input window can be individually frozen.
- Full 24-bit color processing is used throughout.
- Optional control software for Microsoft Windows environments is available from RGB Spectrum.

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SUPPLIED COMPONENTS

STANDARD SUPPLIED COMPONENTS

The following equipment is included in the QuadView *Plus* shipping carton:

TABLE 1. Standard Supplied Components

Item	Part Number
QuadView *Plus*	---
QuadView *Plus* User Manual	350-7313
Power cord (110 or 220 volt)	520-1188 or 520-0271-1
Spare fuse - installed in IEC socket	180-7207
Equipment Warranty Registration Card	330-5477

OPTIONAL ITEMS

RGB Spectrum provides other equipment which may be useful in operating the QuadView *Plus*. These items may be purchased separately:

TABLE 2. Optional Items

Item	Part Number	Description
VGA Cable	520-0298-1	15-pin HD Male to 15-pin HD Male, 6 ft. This cable can be used to connect your analog output/inputs to sources with a female VGA connector.
VGA-to-BNC Adapter	520-0251-1	15-pin HD Male to a 5 BNC cable bundle Male, 6 ft. 10 inches. This cable can be used to connect the analog output/inputs to sources with BNC connectors.

TABLE 2. Optional Items

Item	Part Number	Description
VCP for QuadView *Plus*	720-7283	Virtual Control Panel for the QuadView *Plus*. This is a Windows compatible software application that provides a graphical user interface to serial control of a QuadView *Plus*.
DVI cable	---	This cable is used to connect the optional DVI digital output to a DVI-capable display device. Contact RGB Spectrum for details.

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SYSTEM BASICS

The QuadView *Plus* video windowing system displays four live video/computer windows on a high-resolution, RGB display device.

Each channel accepts RGB, component video, composite video, and S-Video sources for simultaneous display in windows on a high-resolution, RGB display device. Each video signal is displayed in a dedicated window on the output display, and can be independently scaled, postioned, and zoomed.

SERIAL CONTROL OF THE QUADVIEW *PLUS*

The QuadView *Plus* is controlled with ASCII commands sent from a computer, or serial console, via the serial port. During your initial experimentation with the QuadView *Plus* serial port, you will probably find it easier to use a terminal, or a terminal-emulator program (i.e. Hyperterminal or Procomm) running on a computer, in order to try out the examples listed in this manual. Optionally, RGB Spectrum offers software control programs for Microsoft Windows environments.

WINDOWS

Each input to the QuadView *Plus* is displayed in its own window on the high-resolution display device. A window's size, position, video, and image parameters are controlled using serial port commands that identify the desired window as being "1", "2", "3", or "4".

In the factory default configuration, window 1's top left corner is placed 50 pixels to the right of the monitor's top left corner, and 50 lines down from the top—i.e., at the screen position (50, 50). Window 2 starts another 50 pixels over and another 50 lines down—i.e., at (100, 100). Window 3 starts at (150, 150) and window 4 at (200, 200). The exact positioning of the windows may differ from that described above, depending on the resolution of the output. Also note that only RGB inputs will be visible by default; video inputs signals will not be displayed until you change the input type for a particular window.

SELECTING AND DISPLAYING WINDOWS

This section discusses the interaction of zoom, pan, window size, and window position and their control via the serial port.

The QuadView *Plus* maps a user-specified *portion* of each live input into a dedicated window on the monitor. This process involves both a *source* and a *destination* rectangle.

IMAGE RECTANGLES

Image scaling and window size, positioning and clipping (at the edge of the screen) are all affected by the source and destination rectangles for each window input. Both rectangles are adjustable by using the Command Set.

A *source rectangle* selects a rectangular portion of an input image, and this portion is seen in a window on the monitor. Typically, the source rectangle is defined to contain the entire image. Only the currently selected portion of each input image can be viewed, and it is shown in only one window. The QuadView *Plus* automatically changes an input's source rectangle as you use various zoom and pan controls to select and zoom in on portions of the full-size image.

A *destination rectangle* specifies a window's size and screen position. The content of the window is the imagery defined by the source rectangle.

To help you understand what the specification of source and destination rectangles involves, we will explain the nature of these rectangles in more detail. The source rectangle for each input is defined in terms of the input image's coordinate space—its top left corner is positioned using these coordinates, and its width and height are defined the same way. Similarly, each input's destination rectangle is defined in terms of the screen space coordinates of the monitor. Each window is sized and positioned on the monitor as specified by its destination rectangle.

Next, we'll look at some examples of how to specify the coordinates of source and destination rectangles.

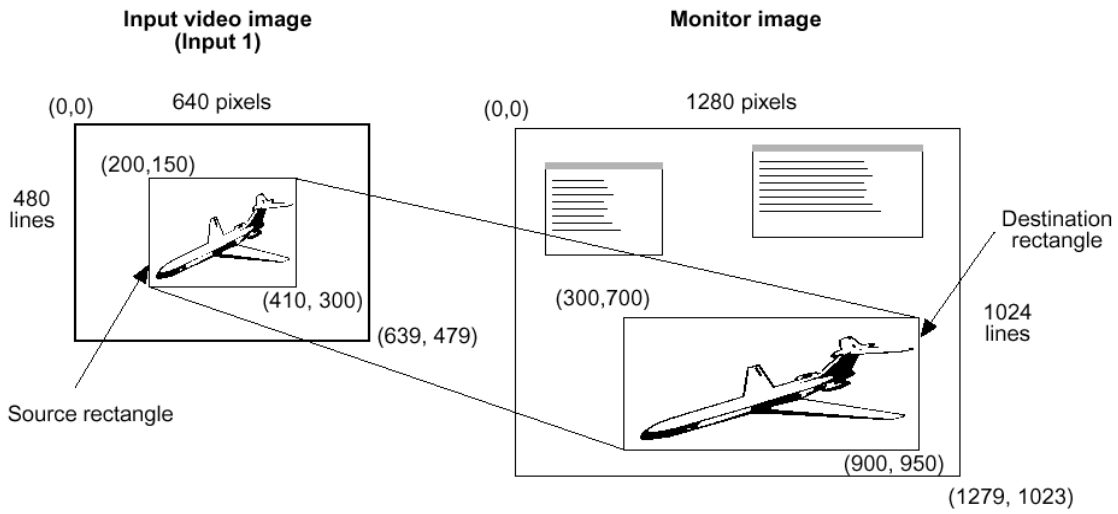

FIGURE 3. **Selection of an Image Segment for Display in a Window**

SERIAL CONTROL

The selection of source and destination rectangles is achieved with the **WSR** and **WDR** commands.

Example—define the source rectangle in Figure 3. That is, for window 1, set the rectangle's top left corner to begin at (200, 150) of the input image, and use a section 210 pixels wide and 150 lines high:

```
>wsr 1 200 150 210 150
```

Example—define the destination rectangle in Figure 3. That is, place the top left corner of window 1 at (300, 700) of the display's raster, and use a window 600 pixels wide and 250 lines high:

```
>wdr 1 300 700 600 250
```

The QuadView *Plus* provides query commands that let you get the current value(s) of most system parameters.

Example—query the QuadView *Plus* on the current **WDR** values for window 1:

```
>wdr 1
```

The system responds by listing the frame buffer coordinate values:

```
>300 700 600 250
```

ASPECT RATIO

Any desired rectangular portion of an input image can be displayed in the corresponding window. Also, the window itself can be set to have any rectangular shape and be any desired size on the monitor, up to the full size of the output raster. The size and shape of the source rectangle are *independent* of the destination rectangle's size and shape. This has important consequences.

Let us suppose that you defined an input's source and destination rectangles so that the central 320 pixels by 240 lines of a video source image were mapped into a 640x480 window. In this case, the destination rectangle is larger than the source rectangle, but has the same shape and the same width-to-height aspect ratio (4:3). Thus, the original input image is scaled equally in both dimensions for display on the monitor.

Varying the destination rectangle's size but preserving its aspect ratio makes the displayed image larger or smaller. As long as its proportions correspond to those of the source rectangle, the displayed image will resemble the input image. If you *independently* vary the shape of either the source or destination rectangle, so that their aspect ratios are no longer the same, your displayed picture will appear stretched or squeezed compared to the original image. Figure 3 shows how the image is stretched by using a destination rectangle with a different, more elongated shape than that of the source rectangle.

POSITIONING AND CLIPPING

A window can be positioned anywhere on the output raster. If the window's destination rectangle is defined so that a portion of the window is off the screen, that portion of the windowed image is clipped (until it is moved back into view). This "image clipping" is illustrated in Figure 4. The window is positioned by specifying the screen coordinates of its top left corner. Negative coordinate values clip from the left and top edges of the window.

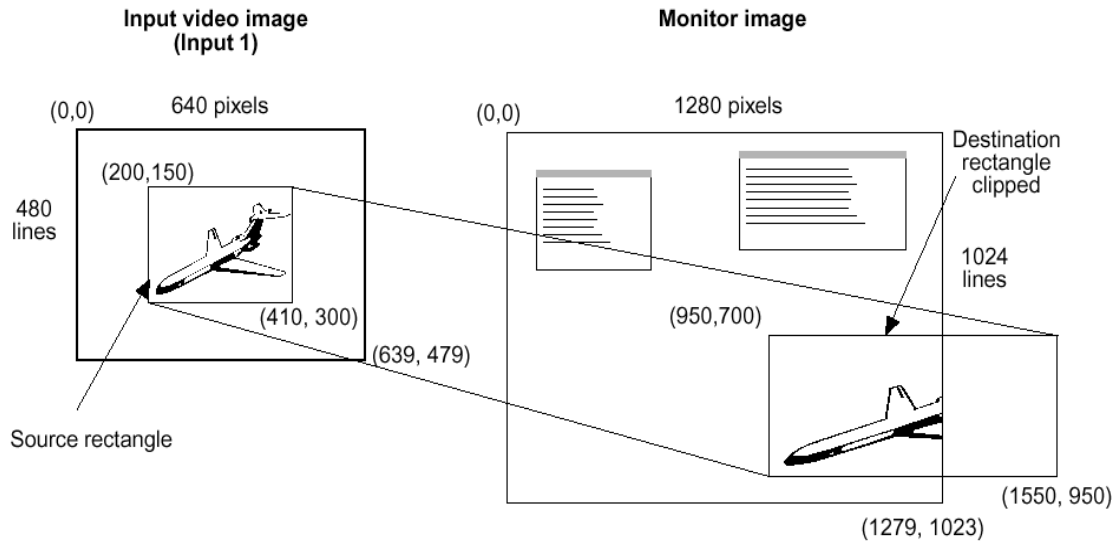

FIGURE 4. **A Clipped Window**

VISIBILITY OF WINDOW IMAGERY

The QuadView's output consists of a high-resolution image assembled from a specified number of input images. It is important to understand which of these inputs will be visible on the monitor.

The following factors determine the visibility of window imagery and background host computer graphics:

- The window's source must be active and connected to an input channel that is turned on.
- A window or windowed region of interest must be unobstructed by other windows.

TURNING WINDOWS ON

The first factor determining whether a window input will be visible is simple—the source must be powered on and properly connected to one of the QuadView's input channels. Also, the channel's associated window must itself

be turned on. The **`WINdow <window#> <ON|OFF>`** command turns windows on and off.

Example—turn window 2 on:

```
>window 2 on
```

PRIORITY LEVELS

The QuadView *Plus* uses window priority levels to determine which of several overlapping windows are visible. You can change the priority levels of windows so that different ones come into the foreground and others move to the background.

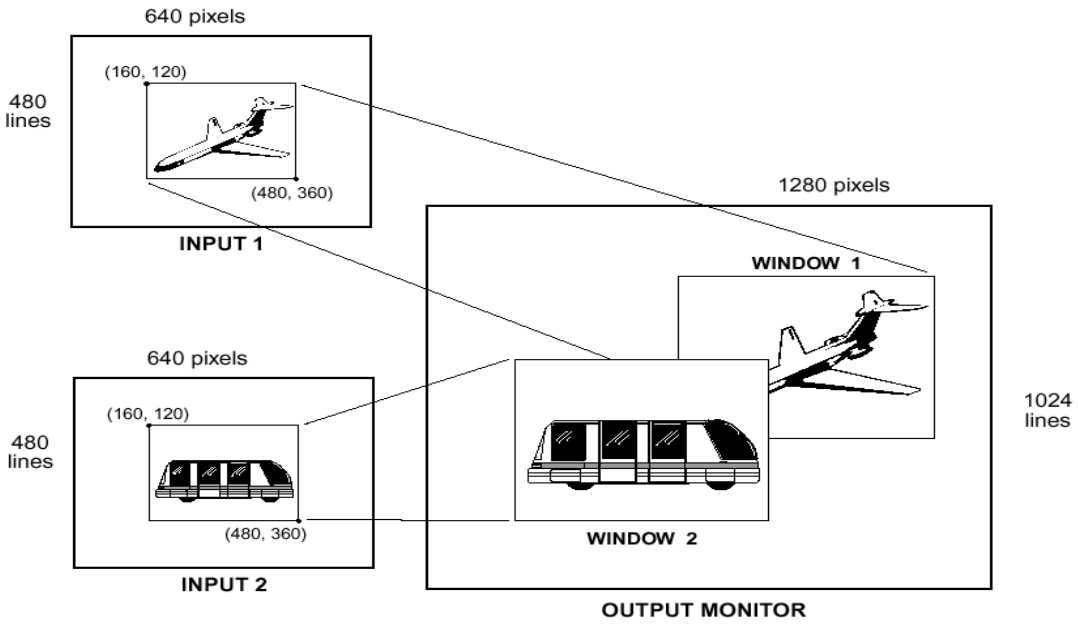

FIGURE 5. **Window Priority—Window 2 has Higher Priority**

When windows overlap, their relative visibility depends on their respective user-assigned priority levels (see Figure 5). The available levels are one through four, where one represents the highest priority. The window with the highest priority is the one that is displayed on top; windows with lower priorities are stacked beneath it. However, keep in mind that only the overlapped region of a window is actually obscured by a higher priority window.

No two windows may have the same priority level. If, for example, one window's priority is increased, the window previously holding that priority is decreased one priority level. Promoting (or demoting) one window leaves the priorities of the other windows unchanged relative to each other.

Priority levels are assigned with the **PRIority <window#> <1..4>** command.

Example—set window 2 to priority level 1:

```
>priority 2 1
```

Since level one corresponds to the highest priority level, window 2 has priority over all other video windows, and hides any overlapped window with a lower priority level.

4

INSTALLATION AND SYSTEM SET UP

CONNECTORS

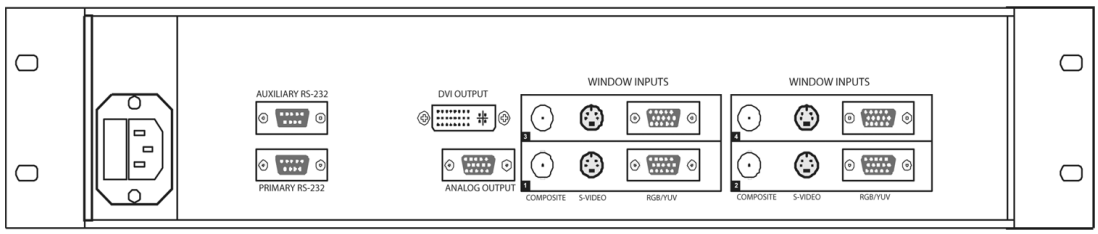

FIGURE 6. **QuadView *Plus* Rear Panel, With Four Inputs in a 2RU Enclosure**

The figure above illustrates the rear panel of QuadView *Plus*. The connectors, their physical type and gender, are listed in the table below.

TABLE 3. **Connector Types**

Connector	Physical Type	Gender
Composite video window input	BNC	Female
S-Video input window input	4-pin mini-DIN	Female
RGB/YUV window input	15-pin HD D-Sub	Female
Analog Output	15-pin HD D-Sub	Female
DVI Output (optional)	DDWG DVI	Female
Auxiliary RS-232	9-pin D-Sub	Female
Primary RS-232	9-pin D-Sub	Female

INSTALLING THE QUADVIEW *PLUS*

To install a QuadView *Plus*, follow the steps outlined below:

STEP 1: POWER

Connect a power cord to the QuadView *Plus*. The QuadView *Plus* is equipped with a universal, 100-220 V, 50-60 Hz power supply.

STEP 2: CONNECT WINDOW SOURCES

Connect your video and/or computer sources to the windows labeled **1-4**

You can connect multiple types of sources to each numbered window—a Composite source, an S-Video source, and either a Component or RGB source. Though all the connectors can be populated with sources, you will have to choose which one to display since only one source can displayed per window.

STEP 3: CONNECT THE ANALOG/DIGITAL OUTPUT

Connect the **ANALOG OUTPUT** of the QuadView *Plus* to the desired display device. This device must be able to accept RGB inputs of at least 100 kHz.

You can also connect the **DVI OUTPUT** to the desired display device. This option can be use in lieu of, or in addition to, the analog output.

STEP 4: CONNECT SERIAL PORT

To control the QuadView *Plus*, connect the COM port of your computer or other terminal control device to the **PRIMARY RS-232** connector. Using a terminal emulation program (i.e. Hyperterminal or Procomm), you can then control the QuadView *Plus* using ASCII serial commands.

CONTROLLING MULTIPLE UNITS

The **AUXILIARY RS-232** serial communications port is provided to implement daisy-chaining of multiple systems. The Auxiliary port of an upstream unit is connected to the Primary port of a downstream unit (Figure 7). When a unit is not selected, it passes all commands to its downstream port, and passes all responses from its Auxiliary port back to the console. See Appendix C, *"Serial Control of Multiple Units,"* for details.

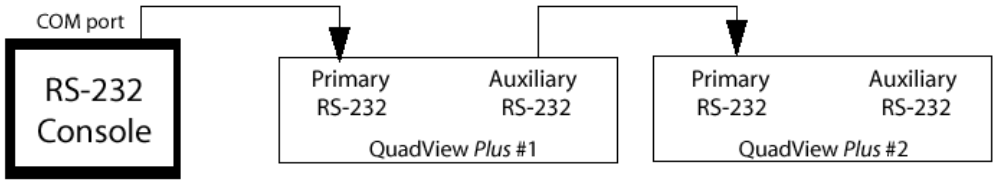

FIGURE 7. **Serial Control of Two QuadViews**

SYSTEM SET UP

The QuadView *Plus* generates sync internally. To set up a QuadView *Plus* for operation, follow the steps outlines below.

INTERACTIVE TIMING ADJUSTMENT

When the QuadView *Plus* is first powered up, it automatically syncs to the output display device that is connected (the output is also referred to as the *host*). This procedure is adequate for most applications and timings, but for

greater accuracy you can fine-tune and store host settings. This fine-tuning is done either by feeding the exact timing numbers (using the **`HostTiming`** command) or by an interactive adjustment procedure through the serial port. The interactive timing adjustment procedure is described below:

Step 1 - Verify connections To perform the interactive timing adjustment, make sure the output display is switched on and connected at the QuadView's ANALOG OUTPUT.

Step 2 - Begin Interactive Timing Adjust (ITA) Using a terminal program, type **`HostInteractive`** and press enter—a white box and cross hair appear on your output display.

Step 3 - First adjustment Starting with the upper-left corner of the box, use the keyboard controls indicated to position the top left corner of the box at the top left corner of the display monitor.

Step 4 - Second adjustment With the upper-left properly adjusted, use the keyboard controls indicated to position the botton right corner of the box at the bottom right corner of the display monitor. Type "q" to save changes.

Step 5 - Repeat adjustment procedure Perform the adjustment procedure for each corner twice. This repetition is necessary to accurately fine-tune the timing parameters.

Saving adjustment Once you have adjusted your host, you should save it to the host list. The next time you use the same host, the QuadView *Plus* will recall your saved settings and use them for the output timing. To save a host, use the **`HostSave`** command.

Once you have completed the ITA procedure, finish the set up of your unit by adjusting the four input windows. Refer to the "*Input Commands*" on page 20 for more information.

5

SERIAL COMMAND SET

This section discusses the QuadView *Plus* serial control commands. The command set provides access to all of the unit's functions.

An optional software control program, called the Virtual Control Panel (VCP), is also available. See "Control Software for Windows" on page 27 for more information on this program.

GENERAL

The command set is made up of ASCII characters and is not case sensitive. The commands can be spelled out or abbreviated. For example, the **Brightness** command can be specified as **brightness, BRIGHTNESS, BRI,** or **bri**.

The entire serial command set for the QuadView *Plus* is presented in this chapter.

Both forms of the command (long and short) are listed, as well as their associated parameters and descriptions. To execute serial instructions, each command line must be followed by a carriage return.

For example, at the prompt (>), a command would be as follows:

bri 3 123 Typing **bri 3 123** will change the brightness of input 3 to a new brightness value of 123.

Illegal commands or arguments generate error messages and correct usage instructions.

SERIAL COMMAND SET USAGE

The serial command set can be used to control the QuadView *Plus*. For example, to set the brightness level of input 1 to 123, type in **BRI 1 123**. The serial command set can also be used to find out the current state for a particular parameter. For example, to find out the brightness level of input 1, type **BRI 1**. The QuadView *Plus* will return the current value (i.e. Brightness = 123).

The uppercase letters in the command name can be used to abbreviate the command on the prompt line. For example, **BRIghtness**, you can use **BRI**, and for **CONTrast**, you can use **CONT**. A space is required between a command and its argument. To execute serial commands, each command line must be followed by a carriage return.

The following tables list all of the commands for controlling the QuadView *Plus*.

INPUT COMMANDS

These commands allow you to make adjustments for your inputs and then save these settings into the unit's internal memory.

Command	Arguments	Description
INput	<input # | ALL> [AUTO | LOCK | DEBUG]	Sets the input mode for the specified input. *Auto* engages the autosync circuitry. *Lock* turns the autosync circuitry off. *Debug* provides information on input status and reports changes to measured parameters. Factory default: AUTO
INputDELete	<1…50>	Deletes the specified saved input from the *Input List*.
INputFormat	<input #>	*InputFormat* is a read-only command for checking the video format of the current video input selection. The command is only valid when *Input Type* is set to either Composite, Component, or S-Video. The response to the command will be NTSC or PAL.
INputInteractive	<input#>	Enters input interactive mode to visually adjust timing parameters of the specified input. A white box frame and cross hair appear over the full screen input. Starting with the upper-left corner of the image, use these keyboard controls to position the image within the white frame: **i** = move up **m** = move down **j** = move left **l** = move right With the upper-left corner properly adjusted, address the lower-right corner next by using these keyboard controls: **I** = move up **M** = move down **J** = move left **L** = move right With the image properly adjusted, quit the utility: **q** = quit After you have adjusted the input to your satisfaction, use the *Input Name* command to name your input source, and the *Input Save* command to store the setting to the *Input List*.
INputLIST	[<1…50>] [<1…50>] [<ACTIVE>]	Displays the entire *Input List* of saved input timings. If arguments are supplied, displays only the portion of the list requested. The *Active* argument displays all saved list entries.
INputLOAD	<input #> <1…50>	Loads the indicated entry from the *Input List* to the specified input channel. The entry is loaded only if it matches the measured parameters of the signal—sync format and polarity, interlace state, vertical total, and horizontal frequency.
INputName	<input #> <name>	Assigns a name to the specified input. The argument can be up to 17 alphanumeric characters with no spaces (underscore is acceptable). Factory default: Auto_1
INputSave	<input#> <1…50>	Saves the specified input to the selected entry in the *Input List*. These settings are recalled whenever the signal is reapplied to the QuadView *Plus*.

Command	Arguments	Description
INputTiming	<input #> <hfp> <hs> <hbp> <hact> <vfp> <vs> <vbp> <vact>	Sets the timing of the selected input. **Note:** The vertical total cannot be changed from the measured value; that is, the total of <vfp> + <vs> + <vbp> + <vact> must remain constant. See Table 4 for acceptable ranges.
INputTYPE	<input#> <COMPOSITE | SVIDEO | COMPONENT | RGB>	The command selects between the four possible inputs types for each channel. One input type per channel can be used at a time. Factory default: RGB
LoadInputList	<1...50> <name> <hfp> <hs> <hbp> <hact> <vfp> <vs> <vbp> <vact> <hfreq> <sync> <hpol> <vpol> <il>	The *LoadInputList* command lets you define input timing strings without requiring the input signal to be present. For example, if one SuperView system had an Input List which must be copied to a second unit, the LoadInputList command could be used to enter in the list entries one by one. The first argument, <1…50>, indicates the Input List entry number to which to store the timing string. The second argument, <name>, gives a customized name to the signal. The next eight arguments, <hfp> <hs> <hbp> <hact> <vfp> <vs> <vbp> <vact>, define the signal's timing. The next five, <hfreq> <sync> <hpol> <vpol> <il>, define the horizontal frequency, sync format and polarity, and interlace status. All 15 arguments must be supplied for the command to be successful.

HOST COMMANDS

The Host commands control the output of the QuadView *Plus*. They define the output or "host" timing and sync format, and save, load, and delete timings to the Host List.

Command	Arguments	Description
ClearHostList	(none)	Clears the *Host List* of all user-defined hosts.
HOST	(none)	A query command which returns information on the selected host timing.
HostDELete	<1..10>	Deletes the specified user-defined host.
HostInteractive	(none)	Enters the host interactive mode. This is an adjustment mode for changing the Host Timing values to better suit your display device. Once in the interactive mode, a white box and cross hair appear on the output display. Starting with the upper-left corner of the box, use these keyboard controls: **i** = move up **m** = move down **j** = move left **l** = move right With the upper-left corner properly adjusted, address the lower-right corner next by using these keyboard controls: **I** = move up **M** = move down **J** = move left **L** = move right With the image properly adjusted, quit the utility: **q** = quit After you have adjusted the input to your satisfaction, use the *Host Name* command to name your input source, and the *Host Save* command to store the *Host List*.

Command	Arguments	Description
HostLIST	[<1…64>] [<1…64>]	Displays the entries in the Host List (Table 5). Without arguments, the command returns the entire list. With one argument, it returns information on the specified Host List entry. With both arguments, it returns the portion of the Host List specified by the arguments. The first 10 entries are user-defined. That is, these slots are reserved for host timing strings the user defines with the *HostTiming* and/or *HostInteractive* commands, and saves with the *HostSave* <1…10> command. Entries 11 through 54 include both progressive (non-interlaced) and interlaced hosts with a standard 4:3 or 5:4 aspect ratio. They are listed in order of decreasing resolution and frequency. Entries 55 through 63 are 16:9 wide screen hosts. Entry 64 is a 1600x1200 pixel host. Factory default: Host #11
HostLOAD	<1…64>	Loads the indicated host from the *Host List.*
HostName	<name>	Assigns a name to the current host. The argument can be up to 17 alphanumeric characters with no spaces (underscore is acceptable). Factory default: Auto_1
HostSave	<1…10>	Saves the current host settings into the *Host List*. The argument specifies which *Host List* position is used.
HostTiming	<input #> <hfp> <hs> <hbp> <hact> <vfp> <vs> <vbp> <vact>	Sets the timing for the current host. Factory default: Host #11, 1280x1024, 75 Hz See Table 5 for a description of Host List.

WINDOW POSITIONING/VISIBILITY

This section contains commands for controlling the display configuration, zoom and pan operations, and freezing inputs.

Command	Arguments	Description
DoubleBuffer	<input#> <ON | OFF>	The double buffering feature eliminates pointer crossover. This is a visual artifact which can be visible in imagery containing horizontal motion—for example, a camera panning from left to right—or scene changes. It appears as a brief, horizontal break in the picture. Your eye may not discern it, but what you are seeing is a portion of one frame of video and a portion of another. With DoubleBuffer ON, pointer crossover is eliminated. The trade off is that horizontal motion may appear a little jerkier. DoubleBuffer is applicable to both RGB and video inputs. When setting DoubleBuffer for input 1, first select the specific input type with the INputType command. DoubleBuffer is only valid if the output host is progressive (non-interlaced), and if the input is an RGB signal, it must also be progressive. DoubleBuffer is also valid for all video inputs. Factory default: ON
FreeZe	<input# | ALL> <ON | OFF>	Turns freeze status of selected input on or off. If *Freeze* is on, it delays action of *Brightness*, *Contrast*, and *Gamma* commands until *Freeze* is turned off. The freeze status is maintained through switches between display configurations, as it is the input that is frozen, not the output. Any change to the host timing resets the freeze status to off. Factory default: OFF

Command	Arguments	Description
MotionFilter	<input #> <ON | OFF>	This command sets the motion filter level for the specified input. When Off, you get the greatest vertical resolution but a possible side effect of motion artifiacts such as "feathered edges" on moving objects. When motion filter is On, motion artifacts are removed, but at the expense of some vertical resolution. Motion filter only applies to video inputs and has no effect on RGB inputs. Factory default: OFF
OVERSCAN	<input #> <ON | OFF>	*Overscan* performs an automatic 2% enlargement on video inputs only. It has no effect on WSR values, and it applies to all video inputs for the specified channel. *Overscan* is useful in trimming out excess blanking in video signals or head switching for VTR sources. Unlike WSR, when *Overscan* is turned on, the enlargement is automatic and constant even when switching between the various video input types. Factory default: OFF
PAN	<input #>	Activates the pan utility for the selected input. Only a zoomed input can be panned. The controls for the utility are as follows: **i** = pan up **m** = pan down **j** = pan left **l** = pan right **q** = quit
POSition	<input #> [<direction> <repetition>]	Activates the position utility, allowing you to the specified input window around the output display. The controls for the utility are as follows: **i** = move up **m** = move down **j** = move left **l** = move right **q** = quit The *direction* and *repetition* arguments allow you to repeat a movement in one direction without repeatedly pressing the key. For example, to move window 1 to the left 20 times, you can type: > POS 1 j 20 The actual pixels or lines that a window moves is determined by the *Setrate* command. In the above example, the window will move 400 pixels to the left (20 times the default rate of 20 pixels). *Position* affects the WDR value for the input.
PRIority	<input # | ALL> <1..4>	Priority numbers run from one through four. Priority one is the highest priority level, meaning a window with priority one appears "in front of" all other windows. If a windows' priority is increased, the window previously at that priority level moves down one and, if necessary, lower priority windows also move down. In other words, no two inputs can have the same priority level. The *All* argument allows you to change the priority level for all inputs at once.
RSR	<input#>	Resets the source rectangle (WSR) to default value, that is equal to the HACT and VACT measurements of the specified input signal. RSR "unzooms" a zoomed image. RSR also resets brightness, contrast, gamma, hue, saturation, and sharpness values to defaults.
SETRATE	<x-rate> <y-rate>	This command determines the number of pixels (x-rate) or lines (y-rate) a window will move with the *Position* command. Factory default: x= 20, y= 20

Command	Arguments	Description
SIZE	<input #>	Activates the size utility, allowing you to resize the specified input window. The controls for the utility are as follows: **s** = smaller **l** = larger **q** = quit *Size* affects the WDR value for the input.
WDR	<input #> <x> <y> <width> <height>	This command sets both the position and size of an input's destination rectangle. The <x> and <y> arguments represent the monitor coordinates of the rectangle's top left corner, but hardware limitations may cause the actual placement to differ slightly from that specified. (When you read WDR for any window, the numbers given accurately reflect the state of the hardware.) The <width> and <height> arguments represent the pixel width and line height of the destination rectangle. The rectangle can be positioned and sized so that part of it is positioned off the screen. WDR is limited to the output resolution of the QuadView *Plus* (full screen display). Example—with an output host resolution of 1024 x 768, set window 4 to be full screen: >WDR 4 0 0 1024 768 Example—place a 100 pixel by 100 line video window at column 300, line 400 on the monitor for input window 2: >WDR 2 300 400 100 100
WINdow	<input# | ALL> <ON| OFF>	The *Window* command is used to turn off one or all inputs. If *Window* is Off and the input to that channel is removed and reapplied within two seconds then the status remains off. If *Window* is On and signal is removed for more than two seconds and then reapplied, the window status reverts to on. This allows for the use of a switcher and maintaining the desired on/off status. It also means that when a previously unused channel is used, the window automatically turns on allowing the new input to be displayed. The WIN ALL command is used to turn all windows on or off simultaneously. Factory default: ALL ON

Command	Arguments	Description
WSR	<input#> <x> <y> <width> <height>	Sets the source rectangle for the selected input. The source rectangle is the portion of the original input that is displayed on screen. By default, WSR is set to show the entire image. That is, the default value for RGB inputs is equal to the HACT and VACT measurements of the specified input signal. For video, WSR defaults to 720x480 for NTSC and 720x574 for PAL. The source rectangle is used to zoom in or out on an image. The <x> and <y> coordinates represent coordinate screen starting point from which to draw the supplied values of <width> and <height>. Example—To zoom in on the upper left quadrant of an 800x600 input, the WSR values are: wsr <input#> 0 0 400 300 To display only the bottom right quadrant, the WSR values are: wsr <input#> 400 300 400 300 The full, default source rectangle for this 800x600 input is: wsr <input#> 0 0 800 600 WSR resets to defaults whenever the signal is acquired or reacquired. That is, if you remove or replace the input signal, or if you change the input type selection on a single channel with the INputTYPE command, then WSR resets to the default values for the newly acquired signal.
ZooM	<input#>	Activates the zoom utility. *Zoom* affects the WSR value for the input. The zoom utility controls are: **i** = zoom in **o** = zoom out **q** = quit The maximum zoom is limited in all cases to no more than two times the original image. Not all inputs generate a 2x zoom ratio, however. The amount of available zoom range is dependent on the pixel rate of the input signal. *Zoom* resets to an unzoomed state whenever the signal is acquired or reacquired. That is, if you remove or replace the input signal, or if you change the input type selection on a single channel with the *InputType* command, then *Zoom* resets to the default values for the new signal.

IMAGE CONTROLS

After you have made your adjustments with the *Input Commands*, you can then adjust the image controls for each input.

Command	Arguments	Description
BRIght	<input# | ALL> <-500…500>	Sets *brightness* value of the selected input. The ALL argument sets brightness for all four inputs. Factory default: 0
CONTrast	<input# | ALL> <0…199>	Sets *contrast* value of the selected input. The ALL argument sets contrast for all four inputs. Factory default: 100
GAMma	<0.5…2.0>	Sets a gamma value for the QuadView *Plus*. For RGB inputs, the value is automatically saved with *InputSave* command. Factory default: 1.0

Command	Arguments	Description
HUE	<input#> <-180…180>	Sets *hue* value of the selected input. Hue is only valid for video inputs. Factory default: 0
SATuration	<input#> <0…199>	Sets *saturation* value of the selected input. Saturation is only valid for video inputs. Factory default: 100
SHARPness	<input#> <0 | 1 | 2 | 3>	Sets *sharpness* value of the selected input. Factory default: 2

SERIAL PORT FUNCTIONS

These commands control the baud and echo settings.

Command	Arguments	Description
BAUDrate	<1200 | 2400 | 9600 | 19200 | 38400 | 57600 | 115200>	Sets the serial port *baud* rate. The value is automatically saved in NVRAM. Factory default: 9600
ECHO	<ON | OFF>	Turns the serial *echo* On/Off. The value is saved in the NVRAM. The *echo* is only on commands typed and sent to the unit. **Note:** *Echo* setting has no effect on responses issued by the QuadView *Plus*; responses are always visible, regardless of the *echo* status. Factory default: ON

MISCELLANEOUS

These commands control a variety of general QuadView *Plus* functions.

Command	Arguments	Description
AUTOSAVE	<ON | OFF>	The *AutoSave* feature automatically stores the system configuration approximately every ten seconds. The process stores configuration information such as *HostList*, *InputList*, *Host* settings, and display parameters. *AutoSave* allows you to turn the NVRAM automatic update mode on or off. Factory default: ON
DEMO	(none)	*Demo* runs the built-in demo sequence. Type “q” to quit demo.
FrontPanel	<ON | OFF>	Enables and disables the front panel. Factory default: ON
Help	[<command>]	*Help*, without an argument will display the entire serial command set. *Help*, with a command as an argument will display detailed information about that command.
ID	(none)	Displays the product identification, product name, firmware version number, date, and serial number.

Command	Arguments	Description
PRESET	<1...6>	Stores your current screen configuration to the designated preset position. This configuration includes window size, position, and order, image parameters, input timing parameters, and output timing parameters. You can reload these presets using the *Recall* command.
RECALL	<1...6> [<all>]	Recalls a previously saved preset configuration. Without the ALL argument, the SuperView recalls only the position, size, and priority level for each input window. With the ALL argument, the SuperView recalls all of the parameters stored in the EEPROM (i.e. input type selection, image controls, etc.). This option will take more time since more parameters are being recalled.
RestoreFactoryDefaults	(none)	Restores all user settings to their factory default values.
SAVECONFIGuration	(none)	Forces an update and explicit save of the system's NVRAM. This stores configuration information such as *HostList*, *InputList*, *Host* settings and display parameters.
STATus	(none)	Returns the *Status* of the QuadView *Plus* and its current settings.
TestPattern	<OFF | MovingBars | GrayScale | ColorBars>	This command turns the designated *TestPattern* (moving bars, grayscale, or color bars) on. Use the Off argument to turn the *TestPattern* off. Factory default: OFF
UpdateFirmWare	(none)	This command updates the firmware for the QuadView *Plus*. If the baud rate is other than 115,200, the user will be prompted to change the baud rate of the terminal emulator and the QuadView *Plus* to 115,200. When this is complete, the *Updatefirmware* command must be re-issued and confirmed. The user is prompted to download the file. On the screen, progress dots appear during the download. See Appendix B for more information on the update procedure.
VERSION	(none)	*Version* returns firmware, hardware, and bootcode revision information.

TABLE 4. Definitions and Ranges for Input Timing Parameters

Parameter	Definition	Range
HFP	Horizontal front porch	0 to 640 pixels
HS	Horizontal sync	16 to 640 pixels
HBP	Horizontal back porch	0 to 640 pixels
HACT	Horizontal active	16 to 1600 pixels
VFP	Vertical front porch	0 to 512 lines
VS	Vertical sync	2 to 32 lines
VBP	Vertical back porch	0 to 512 lines
VACT	Vertical active	12 to 1200 lines
HFREQ	Horizontal frequency in Hz	15 to 90 kHz
SYNC	Sync format	3, 4, or 5 wires
HPOL	Horizontal sync polarity	1 or 0
VPOL	Vertical sync polarity	1 or 0
IL	Interlaced/Noninterlaced	1 or 0

TABLE 5. Host List

#	NAME	HFP	HS	HBP	HACT	VFP	VS	VBP	VACT	HFREQ	SYNC	HPOL	VPOL	IL
1 . . 10	(user defined hosts)													
11	VESA_1280x1024_75	16	144	248	1280	1	3	38	1024	799805	1	1	0	
12	VESA_1280x1024_60	48	112	248	1280	1	3	38	1024	639835	1	1	0	
13	1280x1024___59.94	48	112	248	1280	1	3	38	1024	638975	1	1	0	
14	1280x1024_____50	52	116	250	1280	1	3	38	1024	532995	1	1	0	
15	VESA_1280x960__60	96	112	312	1280	1	3	36	960	600025	1	1	0	
16	1280x960____59.94	96	112	312	1280	1	3	36	960	599415	1	1	0	
17	1280x960_____50	96	112	312	1280	1	3	36	960	500005	1	1	0	
18	EIA_1260x946___30	44	136	164	1260	8	8	61	473	306925	1	1	1	
19	EIA_1164x874___30	36	112	140	1164	6	6	59	437	283425	1	1	1	
20	SUN_1152x900___66	30	128	194	1152	2	4	31	900	617975	1	1	0	
21	APPLE_1152x870_75	32	128	144	1152	3	3	39	870	686815	1	1	0	
22	VESA_1152x864__75	64	128	256	1152	1	3	32	864	675035	1	1	0	
23	EIA_1080x809___30	26	96	118	1080	6	6	54	404	262445	1	1	1	
24	1024x768_____100	24	136	160	1024	3	6	29	768	806065	1	1	0	
25	VESA_1024x768__85	48	96	208	1024	1	3	36	768	686815	1	1	0	
26	VESA_1024x768__75	16	96	176	1024	1	3	28	768	600245	1	1	0	
27	VESA_1024x768__70	24	136	144	1024	3	6	29	768	564785	0	0	0	
28	VESA_1024x768__60	24	136	160	1024	3	6	29	768	483655	0	0	0	
29	1024x768____59.94	24	134	158	1024	3	6	29	768	483115	0	0	0	
30	1024x768_____50	24	136	160	1024	3	6	29	768	403035	0	0	0	
31	VESA_1024x768__43	8	176	56	1024	0	8	41	384	356015	1	1	1	
32	EIA_900x674____30	20	64	80	900	5	5	45	337	218705	1	1	1	

33	APPLE_832x624__74	32	64	224	832	2	3	38	624	497165	1	1	0
34	EIA_832x624____30	16	56	64	832	5	5	41	312	202535	1	1	1
35	800x600_____100	32	96	128	800	1	2	22	600	625005	1	1	0
36	VESA_800x600___85	32	64	152	800	1	3	27	600	536735	1	1	0
37	VESA_800x600___75	16	80	160	800	1	3	21	600	468755	1	1	0
38	VESA_800x600___72	56	120	64	800	37	6	23	600	480795	1	1	0
39	VESA_800x600___60	40	128	88	800	1	4	23	600	378805	1	1	0
40	800x600_____59.94	40	128	88	800	1	4	23	600	376425	1	1	0
41	VESA_800x600___56	24	72	128	800	1	2	22	600	351565	1	1	0
42	800x600_____50	32	96	128	800	1	2	22	600	312505	1	1	0
43	PAL_768x576____25	22	70	84	768	5	5	39	288	156255	0	0	1
44	640x480_____100	16	96	48	640	10	2	33	480	525015	0	0	0
45	VESA_640x480___85	56	56	80	640	1	3	25	480	432695	0	0	0
46	VESA_640x480___75	16	64	120	640	1	3	16	480	375005	0	0	0
47	VESA_640x480___72	24	40	128	640	9	3	28	480	378605	0	0	0
48	VESA_640x480___60	16	96	48	640	10	2	33	480	314735	0	0	0
49	640x480_____59.94	16	96	48	640	10	2	33	480	314735	0	0	0
50	640x480_____50	16	96	48	640	10	2	33	480	262505	0	0	0
51	NTSC_640x480___30	44	112	104	1280	6	6	29	242	157345	0	0	1
52	VESA_720x400___85	36	72	108	720	1	3	42	400	379275	0	1	0
53	VESA_640x400___85	32	64	96	640	1	3	41	400	378605	0	1	0
54	VESA_640x350___85	32	64	96	640	32	3	60	350	378605	1	0	0
55	1280x768_____56	48	112	248	1280	1	3	30	768	451165	0	0	0
56	1280x720_____100	110	40	220	1280	5	5	20	720	750015	0	0	0
57	1280x720_____60	108	40	214	1280	5	5	20	720	450005	0	0	0
58	1280x720____59.94	112	40	224	1280	5	5	20	720	449555	0	0	0
59	1280x720_____50	110	40	220	1280	5	5	20	720	375005	0	0	0
60	852x480_____60	20	66	52	852	6	6	33	480	314915	0	0	0
61	852x480_____59.94	20	66	52	852	6	6	33	480	314685	0	0	0
62	1360x1024__75.1	32	136	272	1360	3	3	35	1024	80000 5	1	1	0
63	1360x768__60	92	40	276	1360	3	6	18	768	47700 5	1	1	0
64	1600x1200_____60	55	164	259	1365	1	3	46	1200	75001 5	1	1	0

CONTROL SOFTWARE FOR WINDOWS

RGB Spectrum offers an optional software control program which runs under Microsoft Windows 95/98/2000/ME/XP/NT. The QuadView *Plus* Virtual Control Panel (VCP) is a graphical user interface for RS-232 serial control.

[screen shot of VCP-will be figure 8]

With the VCP, you have push button control over all functions of the QuadView *Plus*. The VCP requires the same serial connections as described in Appendix A, *"RS-232 Control"*.

The VCP comes with an online help feature, so the application is not covered in this User Manual. If you have purchased the VCP control software, please refer to the online help, accessible on each section of the software via the “Help” button located in the bottom right corner of the screen.

6

TECHNICAL SPECIFICATIONS

Input Signals (in windows)

Number	Four RGB/video channels
Type	RGB: 640x480 to 1600x1200 pixels Video: NTSC/PAL Composite, S-Video, Y PB PR Component
Horizontal Scan Rate	15 kHZ to 90 kHz interlaced or non-interlaced
Video Levels	0.7 V to 1.0 V
Sync Type	Sync on green, separate composite sync, or separate H-Drive and V-Drive
Connectors	RGB/Component: 15-pin HD D-Sub (female) Composite: BNC (female) S-Video: 4-pin mini DIN (female)
Image Controls	Position, scaling, freeze, pan and zoom, brightness, contrast, saturation, hue, gamma, and motion filter

Output Signal

Free Run Mode	User configurable internally generated sync
Analog Output Resolution	Same as above, up to 1600x1200 pixels
Digital Output Resolution	DVI, up to 1280x1024 pixels

Other

User Interfaces	- (2) RS-232 serial ports - Virtual Control Panel software (optional)
Power	100-264 VAC, 47-63 Hz Less than 100 Watts
Size	Width 17.5" (44.5 cm) Depth 18.0" (45.7 cm) Height 3.5" (8.9 cm)
Weight	Approximately 22 lbs (10 kg)

7

TROUBLESHOOTING

Problems with the QuadView *Plus's* operation may result from inappropriate system connections and settings. In the event of difficulty or anomalous results, first check cable connections, the video format associated with each input, the monitor timing selected, and any system options currently in effect. Some of these are discussed in Table 6. Please note that the QuadView Plus's hardware should only be modified or repaired by RGB Spectrum's technicians.

TROUBLESHOOTING GUIDE

TABLE 6. Troubleshooting Guide

Symptom	Recommendations
No Power or Lights	Check that the QuadView *Plus* is plugged in and powered on. Check the fuse located in the line filter. Remove the fuse cover from the power connector panel. The unit is supplied with two fuses; the second one is a spare. If the primary fuse appears blown, replace it with the spare.
No Signal/Poor Signal on Monitor for Computer Input	Make sure a suitable host is loaded from the Host List.
No Windows	Ensure that at least one window is enabled.
Windows have wrong aspect ratio (i.e., are stretched) or are not positioned correctly	Use the HostInteractive command to adjust timing parameter values. Verify that the window source rectangle (WSR) and window destination rectangle (WDR) have the same aspect ratio.
Blank Video Window (window is black)	Ensure that the window's video source is properly connected to the system, powered on and generating a signal. Ensure that the correct type is selected (Composite, Component, or S-Video) with the INputTYPE command.
Frozen Window(s)	If a window is frozen after system start-up, turn freeze off. Use the FreeZe OFF command.
Missing Window Imagery	Check the WSR value to ensure the entire image is being processed. Check WSR and WDR to ensure the source and destination rectangles are delivering the entire video image.
Poor Quality Video	Check the video source for proper operation. Ensure that video sources are not doubly terminated. (Double termination can occur when one video source is split into two using a "T" connector instead of a distribution amplifier.) If you are using a VCR, check the quality of the tape. Adjust the brightness and contrast controls.
Motion Blur on Frozen or Live Video with Fast Moving Imagery	Turn the motion filter on using the MotionFilter serial command.

Symptom	Recommendations
No Text on a terminal	Enable the echo mode when using an ASCII terminal or terminal emulation program to control the system from the RS-232 port, if you wish to see your own typed entries. Use the ECHO command to enable or disable the echo mode. When using an application program running on a computer to control the QuadView *Plus's* functions over the RS-232 port, you may need to disable the echo mode.
Unreliable Control of the QuadView *Plus* from a computer application	See the recommendation immediately above. You may need to disable echo. Check that the baud rate for the QuadView *Plus* and your console device are set to the same speed.

HOW TO CONTACT RGB SPECTRUM

RGB Spectrum can be reached via phone, fax, mail and e-mail:

RGB Spectrum
950 Marina Village Parkway
Alameda, CA 94501

Phone:	(510) 814-7000
Fax:	(510) 814-7026
E-Mail:	support@rgb.com *(for technical support)*
	sales@rgb.com *(for sales and product info)*
Website:	http://www.rgb.com

FIRMWARE UPDATES/README FILES

Please visit our website (www.rgb.com) for product, technical, sales and other company information.

The system firmware can be updated in the field. On our website, under the "Support" section, you will find any available firmware updates (see Appendix B for details) and README files, offering late-breaking technical information on our products.

A

RS-232 CONTROL

The QuadView *Plus* has two RS-232 serial communications ports for remote control of its functions, enabling the QuadView *Plus* to receive data and instructions from host applications, and to be explicitly controlled with commands sent via the serial port from a computer (or ASCII terminal). This port is configured according to the Electronic Industries Association Standard RS-232-C published in August 1969.

Physically, the RS-232 ports are 9-pin D-Sub female connector.

CONNECTING THE RS-232 PORT

The QuadView *Plus* can be explicitly controlled with ASCII Command Set instructions sent via the Primary RS-232 serial port from either a computer or an ASCII terminal. See Chapter 5 for details of the Command Set.

The Auxiliary serial communications port is provided to implement daisy-chaining of multiple systems. The Auxiliary port of an upstream unit is connected to the Primary port of a downstream unit (Figure 9). When a unit is not selected, it passes all commands to its downstream port, and passes all responses from its Auxiliary port back to the console. See Appendix C, *"Serial Control of Multiple Units."*

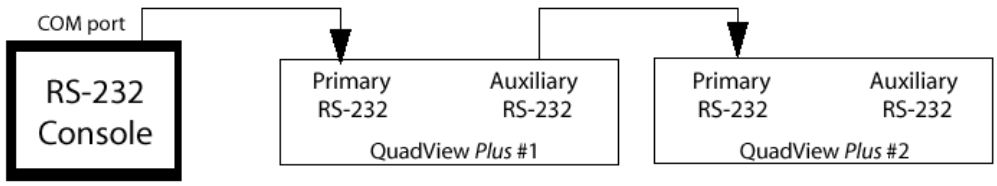

FIGURE 9. **Serial Control of Two QuadViews**

Determine whether the computer's serial port has a 9-pin D-Sub or 25-pin D-Sub connector. Use a 9-pin to 9-pin serial cable to connect the QuadView *Plus*'s serial port to that of the computer (with a 9-pin to 25-pin adapter to complete the connection if necessary).

When controlled from an ASCII terminal, the QuadView *Plus* must echo characters as they are typed—this enables you to see characters as you enter them. However, if you are using a serial port on a UNIX workstation, the "echo" option must be disabled to ensure correct operation. Selection of "echo"

or “no echo” is made with the **ECHO** command. If the QuadView *Plus* is connected to a computer configured as Data Communications Equipment (D.C.E.), you need to use a null modem. See “The Null Modem” on page 36.

Almost all ASCII terminals, and most computer serial ports, are configured as D.T.E. To connect these to QuadView *Plus*, you need a “straight-through” cable with pins 1 through 8 connected. “Straight-through” implies that pin 1 is connected to pin 1, pin 2 to pin 2, and so on (Figure 10). The cable will have a 9-pin male plug on QuadView *Plus*’s end, and the appropriate gender of a 9-pin connector on the other end. Most ASCII terminals and host computers have a 9-pin female connector for their RS-232 port.

The serial cable can be up to 50 feet long for regular cable, or substantially longer for low capacitance cable. Depending on the signals used, one or more of the conductors internal to the cable may not be needed.

PINOUT DESCRIPTION

The 9-pin D-Sub connector is configured as Data Communications Equipment (D.C.E.) with the following signals:

TABLE 7. **RS-232 Serial Port Pinout**

D-Sub 9-pin	Circuit	Description
1	CD	Carrier Detect
2	TD	Transmit Data
3	RD	Received Data
4		(not connected)
5	AB	Signal Ground (common return)
6	DSR	Data Set Ready
7	CTS	Clear to Send
8	RTS	Request to Send
9		(not connected)

As seen in Figure 10, the pins are numbered from top to bottom, right to left. So, looking at the connector, pin #1 is located in the upper right corner, and pin #9 is in the lower left corner.

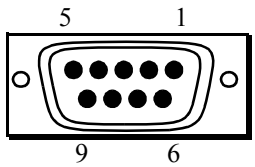

FIGURE 10. **9-pin D-Sub RS-232 Female Connector**

RS-232 PARAMETERS

Ensure that your device is set up with these default serial port parameters.

TABLE 8. RS-232 Parameters

Duplex:	Full
Baud rate:	9600 (default setting)
Data bits:	8
Start bit:	1
Stop bit:	1
Parity:	no parity
Physical:	9-pin D-Sub connector (female)
Configuration:	D.C.E.
Handshake:	X-On / X-Off

Ensure that the controlling host computer or ASCII terminal is set for 9600 baud, 8 data bits, 1 start bit, 1 stop bit and no parity. These are the default serial port parameters. The baud rate and handshake settings can be changed.

Ensure that the Echo/No Echo mode is set appropriately. Transmitted Data is considered an input, and Received Data is considered an output because these signals are named from the perspective of the Data Terminal Equipment (D.T.E.) to which the D.C.E. will normally be connected. Transmitted Data is the signal which communicates commands from the host computer RS-232 port, or the ASCII terminal, to the QuadView *Plus*. Received Data is the signal that returns status, parameter values and, if the SuperView is being controlled by an ASCII terminal, echoes the commands.

Request to Send is a handshaking signal generated by the Data Terminal Equipment. It is always asserted.

Clear to Send is a signal generated by the Data Communications Equipment in response to the Data Terminal Equipment's assertion of **Request to Send**. It indicates that the Data Communication Equipment has recognized the **Request to Send** and is not busy (i.e. it is ready to receive data). **Clear to Send** is always asserted.

Data Set Ready is a signal generated by the Data Communications Equipment, normally to indicate it has power. It is used by the Data Terminal Equipment to verify that the cable is connected, that there is Data Communications Equipment on the other end of the cable and that the equipment is switched on. **Data Set Ready** is always asserted.

Received Line Signal Detector (sometimes known as **Data Carrier Detect**) is a signal generated by the Data Communications Equipment. **Received Line Signal Detector** is always asserted.

Almost all ASCII terminals, and most computer serial ports, are configured as Data Terminal Equipment. To connect these to the QuadView *Plus*, you need a "straight through" cable with pins 1 through 8 connected. "Straight through" implies that pin 2 is connected to pin 2, etc. The cable will have a 9-pin male plug on QuadView *Plus*'s end, and the appropriate gender of a 9-pin connector on the other end. Most ASCII terminals and host computers have a 9-pin female connector for their RS-232 port. This cable may be up to 50 feet long for regular cable, or substantially longer for low capacitance cable. Depending on the signals used, one or more of the conductors internal to the cable may not be needed.

THE NULL MODEM

You may need to connect the QuadView *Plus*'s serial port to a host computer configured as Data Communications Equipment. This is done using a null modem. The net effect of a null modem is to reverse the Transmitted Data and Received Data connections. Also, the Request to Send and Clear to Send connections are reversed. This may be done by using a special "null modem" cable, or by inserting a small "null modem" box or cable in series with a regular "straight through" cable.

B

UPDATING SYSTEM FIRMWARE

The firmware version in the QuadView *Plus* can be field updated via the RS-232 serial port. The firmware is like the operating system in your computer—it instructs the QuadView *Plus* in all of its operations.

Required for the procedure:
1. Computer or terminal capable of serial communications at a 115,200 baud rate;
2. Current firmware update file and update instructions
Do not proceed to update firmware without these two items!

If a firmware update has been published, the file can be downloaded from the RGB Spectrum website at **http://www.rgb.com**, in the Support section. The firmware would also be available on disk directly from RGB Spectrum. Instructions and release notes accompany the update file.

Note: The update firmware process cannot be used from within the QuadView *Plus* VCP control software. You must use a terminal emulation program—such as HyperTerminal or Procomm—or a dumb terminal capable of communicating at 115,200 bps.

After the firmware update procedure is complete, the system is restored to factory defaults. The baudrate is set to 9600 bps and all data previously stored to the EEPROM is erased.

C

SERIAL CONTROL OF MULTIPLE UNITS

The Multi-Product Serial Driver (MPSD) is a protocol for controlling more than one RGB Spectrum product through a single console. The maximum number of MPSD supported products in a single chain is ten. An extra non-MPSD supported device can be connected to the last MPSD device in the chain, making the total controllable devices equal to eleven.

The Auxiliary serial communications port is used to implement daisy-chaining of multiple systems. The Auxiliary port of an upstream device is connected to the primary port of a downstream device (see Figure 11). When a device is not selected, it passes all commands to its downstream port, and passes all responses from its Auxiliary port back to the console.

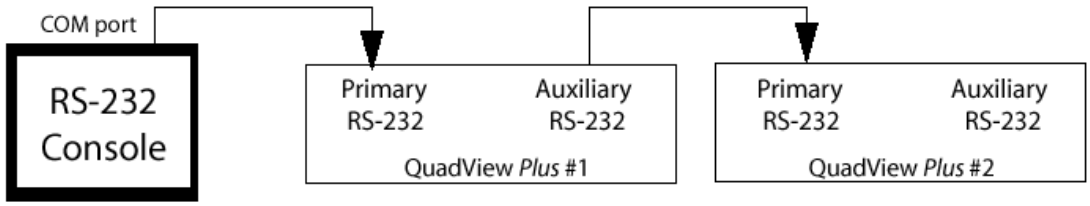

FIGURE 11. **Serial Control of Two QuadView Units**

MPSD COMMANDS

All MPSD commands are preceded with ":" and are buffered by each device that receives them. The devices must be placed in MPSD mode with the **`:assign`** command before any other MPSD commands can be issued.

If the console receives no response from the devices, or a wrong command is issued, entering **`:assign`** usually brings the system back into communication.

`:assign - identifies all connected devices and enters into MPSD mode`

`:assign`

This command identifies all connected devices and places them in MPSD mode. Each device has a unique ID number from 0 to 9. Device 0 is automatically selected to communicate with the terminal console. The ID number or device name is shown with the prompt sign so users can recognize

which device they are working with. Since all MPSD commands are buffered, Device 0 is responsible for echoing MPSD commands to the console.

:unassign - cancels MPSD mode for all connected devices

`:unassign`

This command removes all connected devices from MPSD mode. Device 0 then communicates with the console as a stand-alone device.

:select - selects a particular device to communicate with

`:select <device number|device name>`

Selects a particular device to communicate with the console. Other devices which do not match the device number or device name are deselected. If a non-valid number or name is entered, the console cannot receive any responses to commands or queries because none of the devices is selected. Entering the **:select** command with a valid argument re-establishes communication with the console.

If a non-MPSD device is connected to the end of the chain and a non-valid device number or name is entered, the non-MPSD device is selected. However, if the intent is to control a non-MPSD device in a chain of devices, use the **:auxdevice** command.

:auxdevice - select a non-MPSD device

`:auxdevice`

To send serial commands to a non-MPSD device installed at the end of the MPSD chain, use the **:auxdevice** command. If no such device is connected, the console will not receive any response. When the non-MPSD device is selected, an error message in response to the initial MPSD command may be shown on the console because the non-MPSD device cannot recognize it.

To re-establish communication with the MPSD devices, use either the **:assign** or **:select** command.

:addname - assign a name to a particular device

`:addname <device number> [<device name>]`

This command allows you to assign a name to an MPSD device. The name is permanently stored in the QuadView *Plus*'s memory. The device can be connected to different positions on the chain and the device's name remains attached to it.

If the **[device name]** argument is not entered, the name of the selected device is deleted.

Example—assign the name “Screen2” to the second Super-View in the MPSD chain:

```
Device 0> :addname 1 Screen2
```

:report - check the identity of one or all MPSD device(s) in the chain

```
:report <device number | device name>
```

Reports the identification of one or all MPSD device(s) in the chain.

If the command is entered without argument, all MPSD devices respond by sending a single line of device information to the console. If a device number or device name follows the command, that particular device responds to the console with its identifying information.

MPSD EXAMPLE: BAUD RATE CHANGE

In this example of changing the baud rate by MPSD control, the first step is to place all of the five connected devices in MPSD mode. Next, the baud rate is changed from 9600 (default) to 115200 for each of the five MPSD devices. Then, the baud rate of the terminal console is changed to 115200. Keep in mind that Device 0 is automatically selected to communicate with the terminal console when in MPSD mode. Device 0 is responsible for echoing and relaying MPSD commands. When out of MPSD mode, Device 0 is communicating with the terminal console as a stand-alone unit.

STEP ONE

> :assign	identify all connected devices and enter them into MPSD mode

STEP TWO

Device 0> :select 4	select Device 4 to receive commands
Device 4> baudrate 115200	set baud rate of Device 4 to 115200
> :select 3	select Device 3 to receive command
Device 3> baudrate 115200	set baud rate of Device 3 to 115200
> :select 2	select Device 2 to receive command
Device 2> baudrate 115200	set baud rate of Device 2 to 115200
> :select 1	select device 1 to receive command
Device 1> baudrate 115200	set baud rate of Device 1 to 115200
> :select 0	select Device 0 to receive command
Device 0> baudrate 115200	set baud rate of Device 0 to 115200

STEP THREE

The baud rate on the console can now be changed to 115200, and then:

> :unassign	disengage MPSD mode and clear out serial buffer
> :assign	re-establish MPSD communication mode
Device 0>	

The baud rate is changed starting from the last device in the chain because after the baud rate is set, there will be no communication between that device and the console. Even though there is no prompt sign returned to the console, we still can enter MPSD commands. Selecting the next upstream device in the chain, which is still at the old baud rate, re-establishes communication.

After changing the baud rate for the console, the **`:unassign`** command is issued to clear out the serial buffer before re-establishing communication once again with Device 0.

D

PRODUCT WARRANTY

WARRANTY

RGB Spectrum (RGB) warrants that this product will be free from defects in material and workmanship, under normal use and service when correctly installed and maintained, for a period of one (1) year from date of shipment. RGB's liability under this warranty is limited solely to replacing, repairing or issuing credit for any product which is shown to be defective during the warranty period. Purchaser shall (i) notify RGB promptly in writing of any claims, and (ii) provide RGB with an opportunity to inspect and test the product claimed to be defective. Warranty does not cover misuse, abuse, improper installation or application, improper maintenance or repair, alteration, accident or negligence in use, improper temperature, humidity or other environmental condition, storage, transportation or handling. RGB shall have no obligations under this warranty with respect to any defect unless it receives notice and a description of such defect no later than five (5) business days following the expiration of the warranty period.

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EXTENDED WARRANTY

An annual extended warranty may be purchased. Should the product fail to operate properly during the covered period, RGB will repair the product and restore it to normal operation without charge for labor and parts. Consult the factory for information.